(No Model.)

W. E. ALLINGTON & W. H. CURTIS.

DUST SEPARATOR.

No. 389,786. Patented Sept. 18, 1888.

Fig. 1.

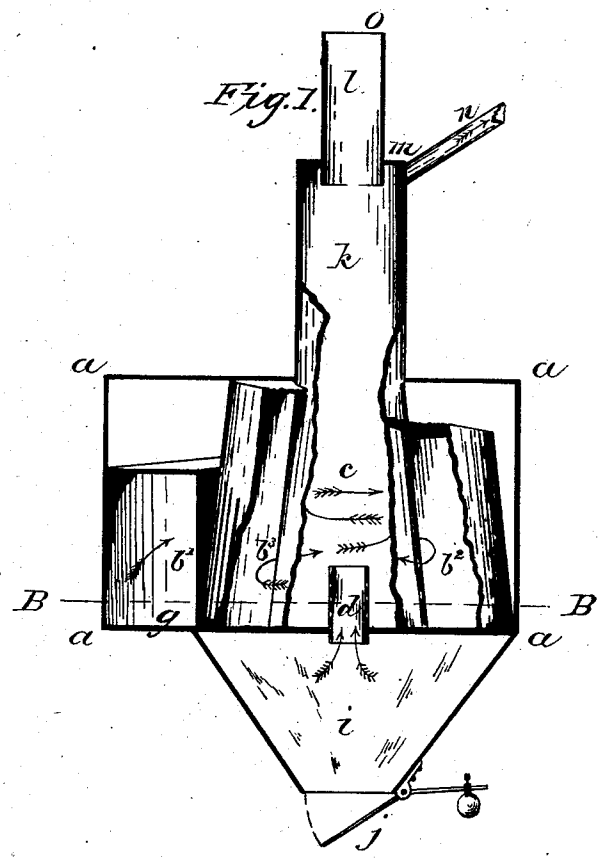
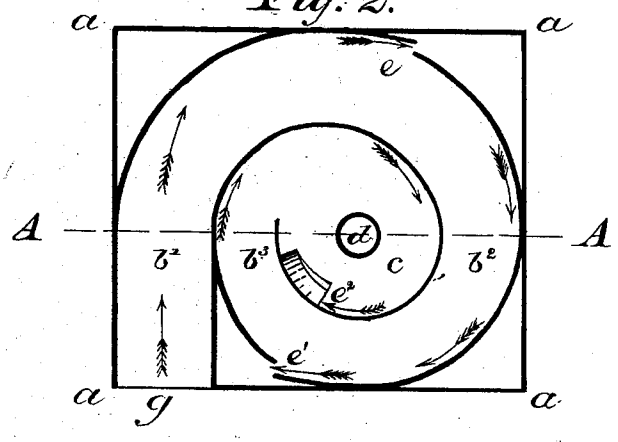


Fig. 2.



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UNITED STATES PATENT OFFICE.

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DUST-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 389,786, dated September 18, 1888.

Application filed October 5, 1886. Serial No. 215,407. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM E. ALLINGTON and WILLIAM H. CURTIS, citizens of the United States, residing, respectively, at East Saginaw, county of Saginaw, and at Jackson, Jackson county, State of Michigan, have invented a new and useful Dust-Separator, of which the following is a specification.

Our invention relates to that class of machines which are used to separate fine dust from heavier material made in planing-mills, flour-mills, and other factories, and effectually disposing of the same; and the objects of our invention are, first, to construct a dust-separator for separating fine and explosive dust from shavings and other heavy material made in planing-mills, flour-mills, and other factories, and effectually dispose of the same; second, to relieve the exhaust-fans used for conveying said material to shaving-vaults or other depositories from back-pressure; and, third, to construct the device in such a manner that it will be fire-proof. These objects we accomplish by the device illustrated in the accompanying drawings, in which—

Figure 1 represents a vertical section of our dust-separator, taken on the line A A of Fig. 2. Fig. 2 is a cross-section taken on the line B B of Fig. 1.

Similar letters of reference indicate like parts in both figures.

In carrying out our invention we preferably construct the separator in the form of a box or casing, which is made of iron to render it fire-proof, although it may be constructed in any other convenient form. This box or casing *a a a a* contains the separating-chamber, which may be circular in cross-section or in the form of a convolute pipe, b' b^2 b^3, ending in a central portion, *c*, which is extended upward in the form of a pipe, *k*. At the point *m* this pipe is somewhat smaller, and has a smaller pipe, *l*, inserted in and extending through a cover on its top, thus forming an annular chamber. At the point *m* another pipe, *n*, is connected to convey the light but not explosive dust to the furnace or other depository.

The convolute pipe b' b^2 b^3 has openings on its outer side at *e e'*, and the central portion, *c*, has an opening at e^2 in its bottom end for discharging shavings or other heavy material into the hopper *i*, which is attached to the bottom side of the box *a a a a*. The bottom of the separating-chamber is provided with a pipe, *d*, inserted therein, communicating with the hopper *i* and extended a distance up into the chamber, as shown in Fig. 1.

The hopper may be made in any convenient form. The bottom end is open, but is held normally closed by a weighted door, *j*, which opens and deposits the load of shavings or other material into the vault or receptacle below when enough has accumulated to overcome the attached weight, as shown by dotted lines in Fig. 1.

The diameter of the separating-chamber, consisting of the convolute pipe b' b^2 b^3, is larger at the bottom than at its top, thus giving a slant to the sides, or it may be constructed with perpendicular sides. The central portion, *c*, is also larger in diameter at its base than the pipe K; but it may also be constructed straight, with no pitch to the sides.

In the operation of the invention the shavings or other material are blown into the separating-chamber or convolute pipe b' b^2 b^3 at the tangentially-arranged opening *g*, and all the heavy material is carried by centrifugal force and gravitation against the outer and lower portion of the chamber and discharged through the openings *e*, *e'*, and e^2 into the hopper *i*, and thence into the vault or other receptacle, as hereinbefore stated. The finer dust or lighter material is carried on into the central portion, *c*, where the air has a circular whirling motion. These lighter portions of the dust or other material are carried by centrifugal force against the sides of the central portion, *c*, up into the pipe *k*, where the rotary or whirling motion of the air and lighter dust continues until they reach the annular chamber formed by the junction of pipes *k* and *l*, where the dust is discharged through pipe *n* into the furnace or other receptacle and the air passed out through said pipe *l*. It is the still lighter and explosive dust that is carried on through the pipe *l* out into the air and floats away, or it may be conducted to any suitable receptacle. The bulk of the air thrown by the fan through the

convolute pipe b' b^2 b^3, portion c, and pipe k also escapes at o through the pipe l, thus giving full vent to the fan and effectually obviating any back-pressure. However, a portion of the air blown by the fan escapes into the hopper i, along with the shavings or heavier material, through the openings e, e', and e^2. This air is drawn back through the pipe d into the central portion, c, and discharged with the other air at o. The draft which draws the air back through the pipe d is produced by the circular whirling upward motion of the air in the central portion, c. This separator is designed to be set on the roof of a vault or receptacle, but can be placed under the roof, if desired.

It will be seen that centrifugal force and gravitation carry the shavings or other material to the openings e, e', and e^2, which are located at the bottom and outside of the chamber or convolute pipe b' b^2 b^3 and portion c, where their diameters are the greatest. This is our object in building the separator with the sides slanting and larger at the bottom than at the top; but the openings may be extended the full height of the sides.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In a dust-separator, the combination, with the separating-chamber, consisting of the convolute pipe b' b^2 b^3 and the central portion, c, formed with downwardly flaring or slanting sides and the openings e, e', and e^2, and provided with the pipe d, of the hopper i, substantially as and for the purpose specified.

2. In a dust-separator, the combination, with the separating-chamber formed with downwardly flaring or slanting sides and the openings e, e', and e^2, and provided with the pipe d, of the hopper i, having a normally-closed lower end, substantially as and for the purpose specified.

3. The combination of the iron box or casing a a a a with the separating-chamber, consisting of the convolute pipe b' b^2 b^3 and central portion, c, and having the openings e e' e^2, arranged as described, and the hopper i, provided with the weighted door j, substantially as described.

4. In a dust-separator, a separating-chamber having slanting sides, larger at the bottom than at the top, one or more discharge-openings, and a bottom, in combination with a hopper and a pipe, as d, passing through said bottom and connecting said hopper and chamber, substantially as described.

5. In a dust-separator, a separating-chamber provided with a central portion extending upward above the main portion of said chamber in the form of a pipe and constituting a passage in which the rotation of the air and very fine dust is continued, and having at its top end and one side, respectively, the air and dust discharge pipes, substantially as described.

6. In a dust-separator, a separating-chamber having a tangential inlet-opening, slanting sides larger at the bottom than at the top, an air-outlet at the top, and one or more dust-discharge openings at the bottom, substantially as described.

7. In a dust-separator, a separating duct or chamber having an air-outlet at its upper end, downwardly flaring or slanting sides, peripheral dust-discharge openings, and a central air-inlet pipe, substantially as described.

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